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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/758,808	01/16/2004	Timothy A. Vang	NGC-00054 (11-1116)	6494

7590 02/10/2005
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EXAMINER

TRA, TUYEN Q

ART UNIT	PAPER NUMBER
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2873

DATE MAILED: 02/10/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/758,808	Applicant(s) VANG ET AL.	
	Examiner Tuyen Q Tra	Art Unit 2873	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 January 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 January 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Oath/Declaration

1. The declaration filed 01/16/04 is acceptable.

Drawings

2. The drawings filed on 1/16/2004 in this application are accepted.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1, 3, 6-8, 10, 14-16 and 18 are rejected under 35 U.S.C. 102(e) as being anticipated by Livingston et al. (U.S. Pat. 6,836,351 B2).
 - a) With respect to claims 1, 8-10, Livingston et al. discloses a quantum-confined stark effect quantum-dot optical modulator in figures 2A and 2B comprising of a substrate (item 225); a first PIN device (item 10a) formed on the substrate and including a P-type layer (item 210), an intrinsic layer (item 220) and an N-type layer (item 215), said intrinsic layer (220) including a quantum dot structure (col. 6, lines 55-58); a second PIN device (item 150b) formed on the substrate (item 225) and including a P-type layer (item 210), an intrinsic layer (item 220) and an N-type layer (item 215), said intrinsic layer (220) including a configuration of quantum dot structure; a Mach-Zehnder interferometer including a first optical path (item 140a) and a second optical path (item

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140b), said intrinsic layer (220) of the first PIN device (150a) being positioned in the first optical path and said intrinsic layer (220) of said second PIN device (150b) being positioned in the second optical path (140b); and a biasing system, said biasing system including a first DC bias source (item 320) applying a first DC bias signal to the intrinsic layer of the first PIN device (150a), a second DC bias (item 325) source providing a second DC bias signal to the intrinsic layer of the second PIN device (150b), and an RF signal source (item 125) providing the RF signal in phase to the intrinsic layers of the first and second PIN devices (Figures 2A and 2B).

b) With respect to claims 3 and 12, Livingston et al. further disclose wherein the first and second DC bias sources provide different DC bias signals to the first and second PIN devices.

c) With respect to claims 6 and 7, Livingston et al. further discloses wherein the first and second DC bias signals provide an operational energy level on opposite sides of an energy density state of the quantum dot structures; wherein the energy density state is determined relative to the carrier frequency of the optical signal.

d) With respect to claim 14, 15, 16 and 18, Livingston et al. disclose a quantum-confined stark effect quantum-dot optical modulator and further with method in figures 2A and 2B comprising of providing a first PIN device formed on a substrate, the first PIN device include a P-type layer, an intrinsic layer and an N-type layer, the intrinsic layer including a quantum dot structure; propagating the optical signal through the first PIN device; and applying the RF signal to the intrinsic layer of the first PIN device; wherein providing a second PIN device formed on the substrate, the second PIN device including a P-type layer, and intrinsic layer and an N-type layer, the intrinsic layer of the second

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PIN device including a quantum dot structure, propagating the optical signal through the second PIN device and applying the RF signal to the intrinsic layer of the second PIN; wherein applying a first DC bias potential to the first PIN device and providing a second DC signal to the second PIN device; wherein the quantum dot structures in the first and second PIN devices are nearly identical.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 2, 4, 5, 11, 12 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Livingston et al. (U.S. Pat. 6,836,351 B2) in view of Cartledge et al. (Journal of Lightwave Technology, Vol. 16, No. 3)

a) With respect to claims 2, 4, 5, 11 and 13, Livingston et al. discloses a quantum-confined stark effect quantum-dot optical modulator in figures 2A and 2B comprising of a substrate (item 225); a first PIN device (item 10a) formed on the substrate and including a P-type layer (item 210), an intrinsic layer (item 220) and an N-type layer (item 215), said intrinsic layer (220) including a quantum dot structure (col. 6, lines 55-58); a second PIN device (item 150b) formed on the substrate (item 225) and including a P-type layer (item 210), an intrinsic layer (item 220) and an N-type layer (item 215), said intrinsic layer (220) including a configuration of quantum dot structure; a Mach-Zehnder interferometer including a first optical path (item 140a) and a second optical path (item 140b), said intrinsic layer (220) of the first PIN device (150a) being positioned in the first

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optical path and said intrinsic layer (220) of said second PIN device (150b) being positioned in the second optical path (140b); and a biasing system, said biasing system including a first DC bias source (item 320) applying a first DC bias signal to the intrinsic layer of the first PIN device (150a), a second DC bias (item 325) source providing a second DC bias signal to the intrinsic layer of the second PIN device (150b), and an RF signal source (item 125) providing the RF signal in phase to the intrinsic layers of the first and second PIN devices (Figures 2A and 2B). However, Livingston et al. does not explicitly disclose wherein the first and second DC bias sources provide different DC bias signals to the first and second PIN devices; wherein the quantum dot structure in the first and second PIN devices are different and the first and second DC bias sources provide the same DC bias to the first and second PIN devices; wherein the modulator is an analog modulator the intensity modulates the optical signal with the amplitude of the RF signal.

Within the same field of endeavor, Cartledge et al explicitly discloses modulating the optic signal of a Mach-Zehnder optical modulator by applying a RF signal in phase to the intrinsic layers of first and second PIN device, wherein the RF signal intensity modulates the optical signal, and the first and second DC bias signals are different. Note table 1 of Cartledge. Therefore, it would have been obvious to a person having skill in the art to augment Livingston et al. method of modulating an optical signal with step of modulating the optical signal of a Mach-Zehnder optical modulator by applying a RF signal in phase to the intrinsic layers of a first and second PIN devices, wherein the RF signal intensity modulates the optical signal, and the first and second DC bias signals are different such as taught by Cartledge in order to build a Mach-Zehnder optical modulator

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with improved transmission performance, on-off performance, time to 3db rise performance, and chirp performance.

b) With respect to claim 17, Livingston et al. disclose a quantum-confined stark effect quantum-dot optical modulator and further with method in figures 2A and 2B comprising of providing a first PIN device formed on a substrate, providing a second PIN device formed on the substrate. However, Livingston does not explicitly disclose wherein the first and second DC bias signals are different.

Within the same field of endeavor, Cartledge et al explicitly discloses modulating the optic signal of a Mach-Zehnder optical modulator by applying a RF signal in phase to the intrinsic layers of first and second PIN device wherein the first and second DC bias signals are different. Note table 1 of Cartledge. Therefore, it would have been obvious to a person having skill in the art to augment Livingston et al. method of modulating an optical signal with step of modulating the optical signal of a Mach-Zehnder optical modulator by applying a RF signal in phase to the intrinsic layers of a first and second PIN devices, wherein the RF signal intensity modulates the optical signal, and the first and second DC bias signals are different such as taught by Cartledge in order to build a Mach-Zehnder optical modulator with improved transmission performance, on-off performance, time to 3db rise performance, and chirp performance.

Conclusion


7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tuyen Tra whose telephone number is (571) 272-2343. The examiner can normally be reached on Monday to Thursday from 8:30am to 6:00pm.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Georgia Epps, can be reached on (571) 272 - 2328. The fax number for this Group is (703) 872-9306.

tt

February 2, 2005


Georgia Epps
Supervisory Patent Examiner
Technology Center 2800